

3-year NHLI-funded PhD post –

Applications are invited for a 3-year PhD studentship starting in mid-late autumn 2024 from candidates with a Master's degree (Merit and above) in Immunology or a related discipline.

The studentship will be funded for 3 years with a tax free bursary of £20,622 p.a.. Tuition fees at the Home rate will also be paid.

Students will join a well-established doctoral training program with bespoke activities, seminars, mentors and workshops.

The National Heart and Lung Institute, Imperial College, is located within the Main Campus at South Kensington, the Brompton Campus, and Hammersmith/White City Campus. Students will have the opportunity to work in state-of-the-art facilities within a highly developed research environment where our ambition is to translate research findings to help those with cardiovascular diseases. All students benefit from a full programme of training in research and transferable skills organised through the Graduate School, the quality of which has been recognised several times at the Times Higher Education (THE) Awards.

Ph D project title:

Defining mechanisms by which the extracellular matrix impacts immune cell function in early life airways disease

Summary of Research: Our lungs possess protein scaffolds called the extracellular matrix (ECM) which maintains the lung architecture and integrity and provides a supportive network for lung cells to reside. During injury the ECM serve as roadways for cells to move around the lung, communicate with neighbouring cells and environmental components as well as encounter foreign material such as allergens or microbes. Over the last decade, it has become increasingly clear that the ECM is not just a scaffold but can affect cell function in multiple ways modifying immune cell phenotype, development, and maturation, all needed to generate an efficient immune response. Work from the host laboratory has shown that the association of immune cells called group 2 innate lymphoid cells to ECM protein collagen-I is vital for controlling eosinophilic inflammation. Furthermore, our preliminary data shows that the ECM environment in early life lungs is highly disrupted with reduced dendritic cell (DC) development and defective DC-cytokine production. DCs are immune cells that sense their environment and are vital for generating broad scale immune responses.

Lung DCs are immature and poorly functional in early life and preliminary data from our laboratory suggests that individual ECM proteins may interfere with DC-maturation and function. In this project, the student will use a neonatal mouse model of allergic airways disease to study in vivo DC-ECM interactions and investigate how the ECM organisation and stiffness impacts DC function in lung inflammation. The project will additionally include airway and blood samples obtained from children with chronic lung disease. The aim will be to develop a novel airways-DC co-culture system to functionally validate how early life lung DC properties are controlled by the changing ECM environment and how harmful disease-associated ECM changes may affect DC

function in response to allergens and viruses. We will identify the molecular pathways involved in the interaction between ECM components and DCs and we anticipate that this project will identify new therapeutic targets that can be manipulated to improve immune responses in early life lung diseases.

The student will have the opportunity to train with animal models of allergic airways disease and work with paediatric patient samples. The techniques routinely used will be flow cytometry, confocal microscopy, second harmonic generation imaging, molecular techniques such as RT-PCR, protein assays such as ELISA's, development of airway coculture models using patient cells and training in technologies such as atomic force microscopy, imaging mass cytometry, spatial transcriptomics and laser capture mass spectrometry.

Applicants should have training in biological sciences and ideally in immunology, with research experience essential. Prior knowledge of respiratory physiology and experience of working with human or mouse samples would all be desirable but not essential.

Imperial College London provides excellent opportunities for research students' training. All students benefit from a full programme of training in research and transferable skills organised through the Graduate School, the quality of which has been recognised several times at the Times Higher Education (THE) Awards.

The student will be based in the section of Inflammation, Repair and Development section within the [National Heart and Lung Institute](#), which provides an exciting environment, with state-of-the-art facilities and excellent opportunities for PhD student training including research seminars and journal clubs. This project will be carried out in close collaboration with clinical teams embedded in the NHLI, and the institute provides extensive collaborative opportunities with other research groups. We expect this studentship to start in the winter of 2024 but can be flexible for the best candidate.

How to Apply

Applicants must hold, or expect to obtain, a first or upper second-class undergraduate degree or UK equivalent, along with a Masters, both in an appropriate subject from a recognised academic institution.

To apply please email the following information to Dr. Franz Puttur at f.puttur@imperial.ac.uk

- Curriculum Vitae (max 2 pages)
- Personal statement (1 page)
- Name, address, telephone number or email of two referees. At least one of which must be academic.

Applicants unable to attend interview in person will undergo an online interview and be invited for a second face-to-face meeting before confirmation of offer.

Please note that candidates must fulfil College admissions criteria.

Committed to equality and valuing diversity. We are also an Athena SWAN Silver Award winner, a Stonewall Diversity Champion, a Disability Confident Employer and are working in partnership with GIRES to promote respect for trans people.

Application deadline: 15.08.24